

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Claims 1, 4, and 5 are currently being amended. Claims 2 and 7 are requested to be cancelled. No claims are being added. After amending the claims as set forth above, claims 1, 4, and 5 are now pending in this application.

Applicant wishes to thank the Examiner for the careful consideration given to the claims.

Rejection of claims 1-2, 4-5, and 7 under 35 U.S.C. in view of Saeki.

The PTO has rejected claims 1-2, 4-5, and 7 as being unpatentable in view of Saeki. This rejection is traversed for at least the following reasons.

Claim 1, as amended, includes a support portion composed of salients and depressions. The salients have a surface roughness Ra of 0.05 μm to 1.3 μm . The depressions have faces having a surface roughness Ra of 3 μm or more when measured for a length of 300 μm and have a coverage area ratio of 20 to 90 % to the total area. Saeki does not disclose, teach, or suggest these features of claim 1.

The PTO asserts that Saeki teaches that the salients are being formed with a surface roughness of 0.1 to 1.5 microns. However, the surface roughness values disclosed by Saeki merely concerns the overall roughness of the resistive layer 3 as already argued in the reply to the previous Office Action and left unaddressed and unrebutted by the PTO. In other words, this surface roughness is the surface roughness of irregularities or undulations formed on the whole surface of the resistive layer 3.

To clarify Applicant's position, reference is made to the figures below. In those figures, the surface roughness as defined in claim 1 of the present invention is a surface roughness of each salient and each depression. In other words, the upper faces of the salients have a certain surface roughness and the faces of the depressions have a certain surface roughness. Claim 1 of the present invention separately defines both the surface roughness of the upper faces of the salients and the faces of the depressions. Because the surface

roughness of the salients and the depressions are separately defined, the surface roughness of claim 1 of the present invention is completely different from the surface roughness disclosed by Saeki. Thus, Saeki does not disclose the surface roughness as defined by claim 1 of the present invention.

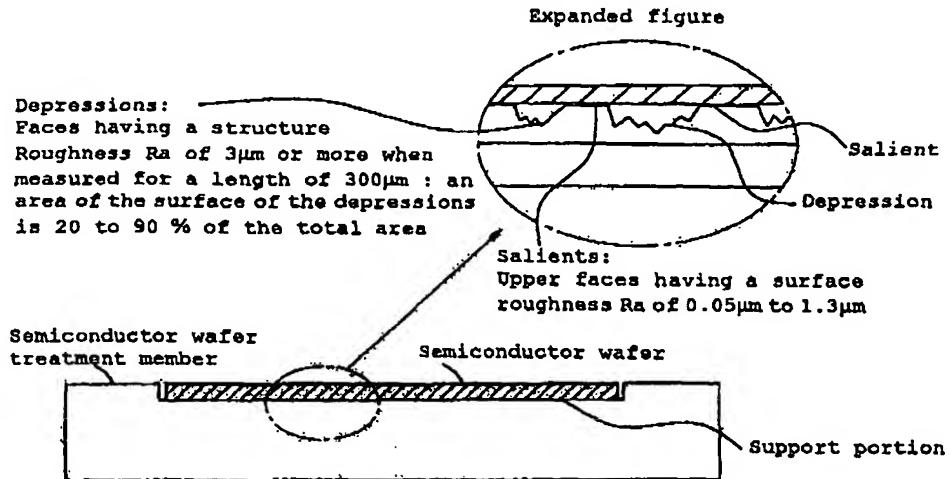


FIG. 1: A Side View of the Present Invention

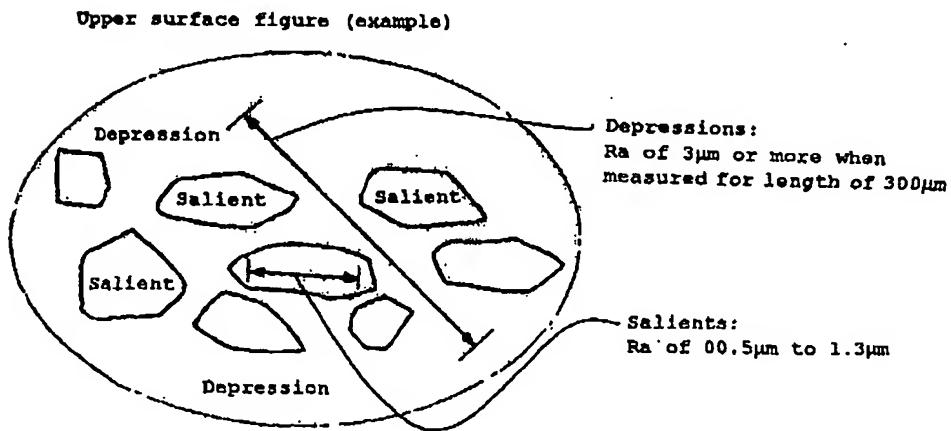


FIG. 2: A Schematic View of a Surface of the Present Invention

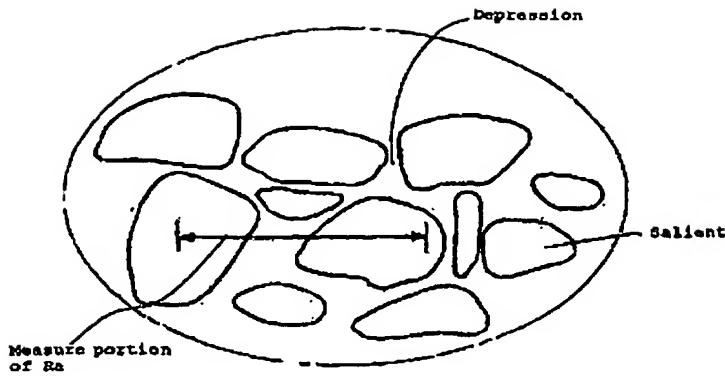


FIG. 3: A Schematic View of a Surface from the Art Disclosed in Saeki.

The PTO has not properly addressed this fact in the last Office Action, and therefore has improperly issued a final rejection without addressing Applicant's arguments.

In addition, Saeki does not disclose, teach, or suggest the claimed surface roughness of the depressions and the surface area coverage of the depressions. The PTO merely maintains that it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the coverage area ratio and the roughness of the depressions based on a variety of factors including the desired degree of adhesion to the wafer.

To establish a case of *prima facie* obviousness, MPEP 2143 states:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations....The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

In the present case, the PTO has failed to satisfy the first and third criteria. As to the third criteria, the PTO has not found any reference for the teachings of the claimed coverage area ratio or the surface roughness of the depressions.

As to the first criteria, the PTO relied upon the assertion that one with ordinary skill in the art would be motivated to determine, through routine experimentation, the optimum coverage ratio and surface roughness of the depressions based on the desired degree of adhesion to the wafer and a variety of other unspecified factors. This assertion is contrary to case law and the MPEP. According to the MPEP 2144.05: "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In this case, there has been no establishment in the prior art of the general conditions, i.e., that the surface roughness of the depressions is different from the surface roughness of the salients. Thus, one cannot be motivated to find an optimum range for a condition that has not even been disclosed. Therefore, the reliance on finding optimum conditions through routine experimentation is misplaced.

Also, the PTO has provided no teaching from the prior art on how adhesion or any of the unspecified factors relate to the coverage area ratio or the surface roughness of the depressions. This position is clearly contrary to the case law and MPEP 2144.05, which states: "A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977)." In this case, the PTO has not pointed to any prior art to support for the proposition that the surface roughness of the depressions or the coverage area ratio are variables that effect adhesion or anything else. Because the PTO has not established that the surface roughness of the depressions and the coverage area ratio are result-effective variables, the use of the argument that one would be motivated to find the optimum ranges for the surface roughness of the depressions and the coverage area ratio to determine the best adhesion is misplaced.

Because the argument of finding optimum ranges through routine experimentation is inapplicable in this case and no other motivation has been provided for determining the claimed surface roughness of the depressions or coverage area ratio, the PTO has failed to satisfy the third criteria for establishing a *prima facie* case of obviousness.

For at least these reasons, reconsideration and withdrawal of the rejection is respectfully requested.

Rejection of claims 1-2, 4- 5, and 7 under 35 USC 103 in view of Toya and Saeki

The PTO has rejected claims 1, 2, 4, 5, and 7 in view of Toya and Saeki. This rejection is traversed for the following reasons.

The PTO contends that Toya teaches that the salients are formed with a surface roughness of 12.5 microns. As presented in the previous reply but left unaddressed and unrebutted by the PTO, the surface roughness that Toya is teaching is the surface roughness of the whole surface of body 2. In other words, this surface roughness is the surface roughness of irregularities or undulations formed on the whole surface of body 2.

As discussed above, the surface roughness as defined in claim 1 of the present invention is a surface roughness of each salient and each depression. Because the surface roughness of the salients and the depressions are separately defined, the surface roughness of claim 1 of the present invention is completely different from the surface roughness disclosed by Toya. Thus, Toya does not disclose the surface roughness as defined by claim 1 of the present invention.

The PTO also argues that the determination of surface roughness for the salients and the coverage area ratio would have been obvious to one with ordinary skill in the art through routine experimentation. As mentioned above, the surface roughness taught by Toya is not the surface roughness of the salients as defined by claim 1 of the present invention. In addition, Toya does not provide a teaching or motivation for one with ordinary skill in the art to use two different surface roughness values for the salients and the depressions or the claimed coverage area ratio. Furthermore, the reliance on the argument that one with ordinary skill in the art would find the optimum ranges based on routine experimentation is inapplicable for the same reasons as given above in regard to Saeki, i.e, there is no general condition disclosed in the art that the surface roughness of the depressions and the surface roughness of the salients are different and the roughness of the depressions and the coverage area ratio are not disclosed in the prior art to be result-effective variables. Finally, Toya does

not provide a teaching or motivation to go outside its value of 12.5 microns for the surface roughness of the salients.

For at least these reasons, reconsideration and withdrawal of the rejection is respectfully requested.

Rejection of claims 1, 2, 4, 5, and 7 under 35 USC 103 in view of Walhauer

The PTO has rejected claims 1-2, 4-5, and 7 in view of Waldhauer. This rejection is traversed for the following reasons.

The PTO contends that Waldhauer teaches that the salients are formed with a surface roughness of 0.16-0.464 microns. As previously argued by Applicant and left unaddressed by the PTO, the surface roughness that Waldhauer is teaching is the surface roughness of the whole surface of face portion. In other words, this surface roughness is the surface roughness of irregularities or undulations formed on the face portion.

As discussed above, the surface roughness as defined in claim 1 of the present invention is a surface roughness of each salient and each depression. Because the surface roughness of the salients and the depressions are separately defined, the surface roughness of claim 1 of the present invention is completely different from the surface roughness disclosed by Waldenauer. Thus, Waldenauer does not disclosed the surface roughness as defined by claim 1 of the present invention.

The PTO also argues that the determination of surface roughness for the depressions would have been obvious to one with ordinary skill in the art through routine experimentation. As mentioned above, the surface roughness taught by Waldenauer is not the surface roughness as defined by claim 1 of the present invention. In addition, Waldenauer does not provide a teaching or motivation for one with ordinary skill in the art to use two different surface roughness values for the salients and the depressions or the claimed coverage area ratio. Furthermore, the reliance on the argument that one with ordinary skill in the art would find the optimum ranges based on routine experimentation is inapplicable for the same reasons as given above in regard to Saeki, i.e, there is no general condition disclose in the art that the surface roughness of the depressions and the surface roughness of the salients are different and the roughness of the depressions and the coverage

area ratio are not disclosed in the prior art to be result-effective variables. Finally, Waldenhauer does not provide a teaching or motivation to go outside its specified range of 4-16 microinches for the surface roughness of the depressions.

For at least these reasons, reconsideration and withdrawal of the rejection is respectfully requested.

Conclusion

The present invention provides a number of possible benefits. First, the silicon carbide film in the depressions is maintained unground with the total area of the depressions having a ratio of 20 to 90% to the total area. As a result, not only the formation of microcracks is restrained in grain boundary of the SiC crystal but also the service life of the semiconductor wafer is made longer while the risk of wafer slippage is reduced. Second, because the SiC crystal grains forming the SiC film on the salients are subjected to grinding such that the surface roughness of the top of the salients are down to $0.05\mu\text{m}$ to $1.3\mu\text{m}$, the adhesion of the semiconductor wafer to the silicon carbide film is controlled within an optimum range. Third, because the depressions have faces having a surface roughness Ra of $3\mu\text{m}$ or more when measured for a length of $300\mu\text{m}$, deformations such as curling of semiconductor wafer are reduced.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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